

WHAT IS CLAIMED IS:

1. A composition having improved sealing and sound dampening properties comprising:
  - 5 (a) one or more polyepoxides comprising at least two epoxide groups per molecule;
  - (b) a thermoplastic polyester polymer;
  - (c) a curing agent adapted to react with the polyepoxides;
  - (d) inorganic particles having an oil absorption value of less than 70
- 10 as determined in accordance with ASTM D 281-95; and
  - (e) inorganic microparticles different from the inorganic particles (d), the inorganic microparticles having an average particle size prior to incorporation into the composition ranging from 0.5 to 200 microns.
- 15 2. The composition according to claim 1, wherein the polyepoxides comprise epoxy polyethers.
3. The composition according to claim 1, wherein the polyepoxides comprise polyglycidyl ethers of polyhydric alcohols.
- 20 4. The composition according to claim 1, wherein the polyepoxides are polyglycidyl esters of polycarboxylic acids.
5. The composition according to claim 1, wherein the polyepoxides are derived by epoxidating olefinically unsaturated alicyclic compounds.
- 25 6. The composition according to claim 1, wherein the polyepoxides contain oxyalkylene groups in the epoxy molecule.
- 30 7. The composition according to claim 1, wherein the polyepoxides comprise epoxy novolac resins.

8. The composition according to claim 1, wherein the polyepoxide is present in an amount ranging from 15 to 50 weight percent based on the total weight of the composition.

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9. The composition according to claim 1, wherein the thermoplastic polyester polymer is substantially free of aromatic units.

10. The composition according to claim 1, wherein the thermoplastic polyester polymer is present in an amount ranging from 3 to 30 weight percent based on the total weight of the composition.

11. The composition according to claim 1, wherein said curing agent is an aliphatic, cycloaliphatic, or aromatic polyfunctional amine.

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12. The composition according to claim 1, wherein said curing agent is present in the composition in an amount ranging from 1 to 50 percent by weight, based on the total weight of the composition.

20 13. The composition according to claim 1, wherein the inorganic particles are selected from particles having a spherical morphology, irregular morphology, or platy morphology, needle shaped, and mixtures thereof.

25 14. The composition according to claim 1, wherein the inorganic particles have a particle size prior to incorporation into the composition ranging from 5 to 200 microns.

15. The composition according to claim 1, wherein the inorganic particles comprise mica, calcium carbonate, dolomite, talc, and/or calcium metasilicate.

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16. The composition according to claim 1, wherein the inorganic particles are present in an amount ranging from 15 to 50 weight percent based on the total weight of the composition.

5 17. The composition according to claim 1 that is capable of being spray applied.

18. The composition according to claim 1 further comprising one or more alkylene diene copolymers.

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19. The composition according to claim 1, wherein the inorganic microparticles comprise colloidal silica, calcium modified precipitated silica, ion exchange silica gel, colloidal alumina, colloidal zirconia, and mixtures thereof.

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20. The composition according to claim 1 further comprising one or more metallic compounds comprising a cation selected from zinc, aluminum, magnesium, calcium, strontium, titanium, zirconium, cesium, yttrium, and iron cations; and an anion selected from phosphate, polyphosphate, phosphite, molybdate, sulfonate, tungstate, borate, borosilicate, silicate, and cyanamide.

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21. A multilayer composite comprising a weldable primer layer formed from a weldable primer composition, and a second layer having improved sealing and sound dampening properties formed from a second composition over at least a portion of the weldable primer layer, the second composition comprising:

(a) one or more polyepoxides comprising at least two epoxide groups per molecule;

(b) a thermoplastic polyester polymer;

30 (c) a curing agent adapted to react with the polyepoxide (a);

(d) inorganic particles having an oil absorption value of less than 70 as determined in accordance with ASTM D 281-95; and

(e) inorganic microparticles different from the inorganic particles (d), the inorganic microparticles having an average particle size prior to incorporation into the composition ranging from 0.5 to 200 microns.

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22. The multilayer composite according to claim 21, wherein the weldable primer layer is formed from a weldable primer composition comprising:

(A) a resinous binder comprising:

10 (1) at least one functional group-containing polymer, and

(2) at least one curing agent having functional groups reactive with the functional groups of (1); and

(B) at least one electroconductive pigment dispersed in resinous binder (A).

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23. A coated metallic substrate comprising:

a metallic substrate, and a composition having sealing and sound dampening properties over at least a portion of the substrate, said composition comprising:

20 (a) one or more polyepoxides comprising at least two epoxide groups per molecule;

(b) a thermoplastic polyester polymer;

(c) a curing agent adapted to react with the polyepoxides (a);

(d) inorganic particles having an oil absorption value of less than 70

25 as determined in accordance with ASTM D 281-95; and

(e) inorganic microparticles different from the inorganic particles (d), the inorganic microparticles having an average particle size prior to incorporation into the composition ranging from 0.5 to 200 microns.

30 24. The substrate according to claim 23, wherein the polyepoxide comprises an epoxy polyether.

25. The substrate according to claim 23, wherein the polyepoxide comprises a polyglycidyl ether of polyhydric alcohol.

5 26. The substrate according to claim 23, wherein the polyepoxide comprises a polyglycidyl ester of polycarboxylic acid.

27. The substrate according to claim 23, wherein the polyepoxide is derived by epoxidating olefinically unsaturated alicyclic compounds.

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28. The substrate according to claim 23, wherein the polyepoxide contains oxyalkylene groups in the epoxy molecule.

29. The substrate according to claim 23, wherein the thermoplastic

15 polyester polymer is present in an amount ranging from 3 to 30 weight percent based on the total weight of the composition.

30. The substrate according to claim 23, wherein the inorganic particles are selected from particles having a spherical morphology, irregular

20 morphology, platy morphology, needle shaped, and mixtures thereof.

31. The substrate according to claim 23, wherein the inorganic particles have a particle size prior to incorporation into the composition ranging from 5 to 200 microns.

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32. The substrate according to claim 23, wherein the composition further comprises one or more alkylene diene copolymers.

33. The substrate according to claim 23, wherein the inorganic microparticles comprise colloidal silica, calcium modified precipitated silica, ion exchange silica gel, colloidal alumina, colloidal zirconia, and mixtures thereof.

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34. The substrate according to claim 23, wherein the composition further comprises one or more metallic compounds comprising a cation selected from zinc, aluminum, magnesium, calcium, strontium, titanium, zirconium, cesium, yttrium, and iron cations; and an anion selected from phosphate, 10 polyphosphate, phosphite, molybdate, sulfonate, tungstate, borate, borosilicate, silicate, and cyanamide.

35. A coated metallic substrate comprising:  
a metallic substrate;  
15 a weldable primer layer formed from a weldable primer composition deposited over at least a portion of the substrate; and  
a second layer formed from a second composition having sealing and sound dampening properties deposited over at least a portion of the weldable primer layer, the second composition comprising:  
20 (a) one or more polyepoxides comprising at least two epoxide groups per molecule;  
(b) a thermoplastic polyester polymer;  
(c) a curing agent adapted to react with the polyepoxides (a);  
(d) inorganic particles having an oil absorption of less than 25 70; and  
(e) inorganic microparticles different from the inorganic particles (d),  
the inorganic microparticles having an average particle size prior to incorporation into the composition ranging from 0.5 to 200 microns.

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36. The coated metallic substrate of claim 35, wherein the metallic substrate is selected from the group comprising ferrous metal, non-ferrous metal, and combinations thereof.

5 37. The coated metallic substrate according to claim 35, wherein the polyepoxide comprises an epoxy polyether.

38. The coated metallic substrate according to claim 35, wherein the polyepoxide comprises a polyglycidyl ether of polyhydric alcohol.

10 39. The coated metallic substrate according to claim 35, wherein the polyepoxide comprises a polyglycidyl ester of polycarboxylic acid.

15 40. The composition according to claim 35, wherein the polyepoxide is derived by epoxidating olefinically unsaturated alicyclic compounds.

41. The coated metallic substrate according to claim 35, wherein the second composition further comprises one or more alkylene diene copolymers.

20 42. The coated metallic substrate according to claim 35, wherein the inorganic microparticles comprise colloidal silica, calcium modified precipitated silica, ion exchange silica gel, colloidal alumina, colloidal zirconia, and mixtures thereof.

25 43. The coated metallic substrate according to claim 35, wherein the second composition further comprises one or more metallic compounds comprising a cation selected from zinc, aluminum, magnesium, calcium, strontium, titanium, zirconium, cesium, yttrium, and iron cations, and an anion selected from phosphate, polyphosphate, phosphite, molybdate, sulfonate, tungstate, borate, borosilicate, silicate, and cyanamide.

44. The composition according to claim 35, wherein the first weldable primer layer is formed from a weldable primer composition comprising:

(A) a resinous binder comprising:

5 (1) at least one functional group-containing polymer, and  
(2) at least one curing agent having functional groups

reactive with the functional groups of (1); and

10 (B) at least one electroconductive pigment dispersed in resinous binder (A).

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45. A method for forming a coating having sealing and sound dampening properties on a metallic substrate comprising the steps of:

(a) providing a metallic substrate having two major surfaces;

15 (b) applying a composition to at least a portion of one of the major surfaces of the substrate, said composition comprising:

(1) one or more polyepoxides comprising at least two epoxide groups per molecule;

(2) a thermoplastic polyester polymer;

(3) a curing agent adapted to react with the polyepoxides (1);

20 (4) inorganic particles having an oil absorption value of less than 70 as determined in accordance with ASTM D 281-95; and

(5) inorganic microparticles different from the inorganic particles (4), the inorganic microparticles having an average particle size prior to incorporation into the composition ranging from 0.5 to 200

25 microns; and

(c) curing the applied composition,

30 wherein the coated substrate of step (c) has a sound dampening value greater than 0.030 Oberst dissipation factor as measured at 200 Hz at 25°C in accordance with ASTM E-756-98.

46. The method according to claim 45, wherein the cured composition has a dry film thickness ranging from 10 to 300 mils (250 to 7,500 micrometers).

47. The method according to claim 45, wherein the substrate of step (c) is  
5 heated to a temperature ranging from 90°C to 180°C.

48. In a composition having sealing and sound dampening properties comprising:

10 (a) one or more polyepoxides comprising at least two epoxide groups;  
(b) a thermoplastic polyester polymer;  
(c) a curing agent adapted to react with the polyepoxide (a); and  
(d) inorganic particles having an oil absorption value of less than 70 as determined in accordance with ASTM D 281-95,  
15 the improvement comprising the inclusion in the composition of inorganic microparticles different from the inorganic particles (d) in an amount sufficient to provide corrosion resistance properties as measured in accordance with Chrysler Test Method LP-463PB-10-01 which are superior to the corrosion resistance properties of the same composition which does not  
20 contain said inorganic microparticles, the inorganic microparticles having an average particle size prior to incorporation into the composition ranging from 0.5 to 200 microns.

25 49. The composition in accordance with claim 48, wherein the inorganic microparticles are selected from the group consisting of mica, calcium carbonate, dolomite, talc, calcium metasilicate and mixtures thereof.

30 50. The composition in accordance with claim 48, wherein the inorganic microparticles have a particle size prior to incorporation into the composition ranging from 3 to 150 microns.

51. The composition in accordance with claim 48, wherein the inorganic microparticles are present in the composition in an amount ranging from 0.1 to 5 weight percent based on the total weight of the composition.

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